

3 Operating and runtime systems for high-end computing systems: MOLAR: adaptive runtime support for high-end computing operating and runtime systems

Christian Engelmann, Stephen L. Scott, David E. Bernholdt, Narasimha R. Gottumukkala, Chokchai Leangsuksun, Jyothish Varma, Chao Wang, Frank Mueller, Aniruddha G. Shet, P. Sadayappan

April 2006 ACM SIGOPS Operating Systems Review, Volume 40 Issue 2

Publisher: ACM Press

Full text available: pdf(522.07 KB) Additional Information: full citation, abstract, references, index terms

MOLAR is a multi-institutional research effort that concentrates on adaptive, reliable, and efficient operating and runtime system (OS/R) solutions for ultra-scale high-end scientific computing on the next generation of supercomputers. This research addresses the challenges outlined in FAST-OS (forum to address scalable technology for runtime and operating systems) and HECRTF (high-end computing revitalization task force) activities by exploring the use of advanced monitoring and adaptation to i ...

Keywords: RAS, availability, fault tolerance, group membership, high-end computing, monitoring, reliability

4 Can unstructured P2P protocols survive flash crowds?

Dan Rubenstein, Sambit Sahu

June 2005 IEEE/ACM Transactions on Networking (TON), Volume 13 Issue 3

Publisher: ACM Press

Full text available: 📆 pdf(345.18 KB) Additional Information: full citation, abstract, references, index terms

Today's Internet periodically suffers from hot spots, a.k.a., flash crowds. A hot spot is typically triggered by an unanticipated news event that triggers an unanticipated surge of users that request data objects from a particular site, temporarily overwhelming the site's delivery capabilities. During this time, the large majority of users that attempt to get these objects face the frustrating experience of not being able to retrieve the content they want while still being able to communicate ef ...

Keywords: average case analysis, flash crowds, peer-to-peer

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1 Manageability, availability, and performance in porcupine: a highly scalable, cluster-



based mail service

Yasushi Saito, Brian N. Bershad, Henry M. Levy

August 2000 ACM Transactions on Computer Systems (TOCS), Volume 18 Issue 3

Publisher: ACM Press

Full text available: pdf(2.52 MB)

Additional Information: full citation, abstract, references, index terms

This paper describes the motivation, design and performance of Porcupine, a scalable mail server. The goal of Porcupine is to provide a highly available and scalable electronic mail service using a large cluster of commodity PCs. We designed Porcupine to be easy to manage by emphasizing dynamic load balancing, automatic configuration, and graceful degradation in the presence of failures. Key to the system's manageability, availability, and performance is that sessions, data, and underlying ...

Keywords: cluster, distributed systems, email, group membership protocol, load balancing, replication

2 Some Deadlock Properties of Computer Systems



Richard C. Holt

September 1972 ACM Computing Surveys (CSUR), Volume 4 Issue 3

Publisher: ACM Press

Full text available: pdf(1.46 MB)

Additional Information: full citation, references, citings, index terms

3 Research papers: correctness and trust: Middleware based data replication providing



snapshot isolation

Yi Lin, Bettina Kemme, Marta Patiño-Martínez, Ricardo Jiménez-Peris

June 2005 Proceedings of the 2005 ACM SIGMOD international conference on Management of data

Publisher: ACM Press

Full text available: pdf(470.92 KB) Additional Information: full citation, abstract, references

Many cluster based replication solutions have been proposed providing scalability and fault-tolerance. Many of these solutions perform replica control in a middleware on top of the database replicas. In such a setting concurrency control is a challenge and is often performed on a table basis. Additionally, some systems put severe requirements on transaction programs (e.g., to declare all objects to be accessed in advance). This paper addresses these issues and presents a middleware-based replica ...



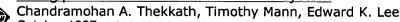
Frontmatter (TOC, Letters, Philosophy of computer science, Interviewers needed, Taking software requirements creation from folklore to analysis, SW components and product lines: from business to systems and technology. Software engineering

September 2005 ACM SIGSOFT Software Engineering Notes, Volume 30 Issue 5

Publisher: ACM Press

Full text available: pdf(1.98 MB) Additional Information: full citation, index terms

5 Frangipani: a scalable distributed file system



October 1997 ACM SIGOPS Operating Systems Review , Proceedings of the sixteenth ACM symposium on Operating systems principles SOSP '97, Volume 31 Issue

Publisher: ACM Press

Full text available: pdf(2.20 MB) Additional Information: full citation, references, citings, index terms

High Availability Cluster Checklist

Tim Burke

November 2000 Linux Journal

Publisher: Specialized Systems Consultants, Inc.

Full text available: html(17.23 KB) Additional Information: full citation, abstract, index terms

With a variety of clustering services on the market, the ability to determine how well options meet your specific business needs is necessary.

7 Q focus: databases: Beyond relational databases

Margo Seltzer

April 2005 Queue, Volume 3 Issue 3

Publisher: ACM Press

Full text available: pdf(654.63 KB)

Additional Information: full citation, abstract, references, index terms html(35.21 KB)

There is more to data access than SQL.

Queue Focus: Game Development: Massively Multiplayer Middleware

Michi Henning

February 2004 Queue, Volume 1 Issue 10

Publisher: ACM Press

Full text available: pdf(2.34 MB) Additional Information: full citation, index terms

html(28.00 KB)

9 Potpourri: Fast and transparent recovery for continuous availability of cluster-based

Rosalia Christodoulopoulou, Kaloian Manassiev, Angelos Bilas, Cristiana Amza March 2006 Proceedings of the eleventh ACM SIGPLAN symposium on Principles and practice of parallel programming PPoPP '06

Publisher: ACM Press

Full text available: pdf(111.02 KB) Additional Information: full citation, abstract, references, index terms

Recently there has been renewed interest in building reliable servers that support continuous application operation. Besides maintaining system state consistent after a failure, one of the main challenges in achieving continuous operation is to provide fast reconfiguration. The complexity of the failure reconfiguration mechanisms employed and their overheads depend on the type of platform that is being used as a server and the

types of applications that need to be supported. In this paper we foc ...

Keywords: availability, distributed shared memory, fast failure reconfiguration, fault tolerance, scalability

10 A new approach to developing and implementing eager database replication



protocols

Bettina Kemme, Gustavo Alonso

September 2000 ACM Transactions on Database Systems (TODS), Volume 25 Issue 3

Publisher: ACM Press

Full text available: pdf(449.43 KB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> <u>terms</u>, <u>review</u>

Database replication is traditionally seen as a way to increase the availability and performance of distributed databases. Although a large number of protocols providing data consistency and fault-tolerance have been proposed, few of these ideas have ever been used in commercial products due to their complexity and performance implications. Instead, current products allow inconsistencies and often resort to centralized approaches which eliminates some of the advantages of replication. As an ...

Keywords: database replication, fault-tolerance, group communication, isolation levels, one-copy-serializability, replica control, total error multicast

11 Affinity-based management of main memory database clusters



Minwen Ji

November 2002 ACM Transactions on Internet Technology (TOIT), Volume 2 Issue 4

Publisher: ACM Press

Full text available: pdf(553.96 KB) Additional Information: full citation, abstract, references, index terms

We study management strategies for main memory database clusters that are interposed between Internet applications and back-end databases as content caches. The task of management is to allocate data across individual cache databases and to route queries to the appropriate databases for execution. The goal is to maximize effective cache capacity and to minimize synchronization cost. We propose an affinity-based management system for main memory database cLUsters (*ALBUM*). ALBUM executes ea ...

Keywords: Main memory database, clustering, database administration, database cluster, file organization, query affinity, scalability

12 AFS—a secure distributed filesystem, Part III

Alf Wachsmann

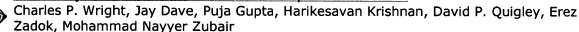
April 2005 Linux Journal, Volume 2005 Issue 132

Publisher: Specialized Systems Consultants, Inc.

Full text available: html(22.05 KB) Additional Information: full citation, abstract, index terms

Reconfigure servers without changing mount points on the clients with this Kerberos-authenticated network filesystem.

13 Versatility and Unix semantics in namespace unification



February 2006 ACM Transactions on Storage (TOS), Volume 2 Issue 1

Publisher: ACM Press

Full text available: pdf(317.82 KB) Additional Information: full citation, abstract, references, index terms

Administrators often prefer to keep related sets of files in different locations or media, as it is easier to maintain them separately. Users, however, prefer to see all files in one

location for convenience. One solution that accommodates both needs is virtual namespace unification---providing a merged view of several directories without physically merging them. For example, namespace unification can merge the contents of several CD-ROM images without unpacking them, merge binary directories fr ...

Keywords: Namespace management, directory merging, snapshotting, stackable file systems, unification

14 Research sessions: consistency and availability: Highly available, fault-tolerant.



parallel dataflows

Mehul A. Shah, Joseph M. Hellerstein, Eric Brewer

June 2004 Proceedings of the 2004 ACM SIGMOD international conference on Management of data

Publisher: ACM Press

Full text available: pdf(210.17 KB) Additional Information: full citation, abstract, references, citings

We present a technique that masks failures in a cluster to provide high availability and fault-tolerance for long-running, parallelized dataflows. We can use these dataflows to implement a variety of continuous query (CQ) applications that require high-throughput, 24x7 operation. Examples include network monitoring, phone call processing, click-stream processing, and online financial analysis. Our main contribution is a scheme that carefully integrates traditional query processing techniques for ...

15 Poster session: papers included: System centric mission critical simulation model for



MES automation

Amit Jindal, Rajkumar Khandelwal

December 2005 Proceedings of the 37th conference on Winter simulation WSC '05

Publisher: Winter Simulation Conference

Full text available: pdf(217.40 KB) Additional Information: full citation, abstract, references

This paper describes the system centric simulation methodology used for stress testing of Manufacturing Execution System (MES) in Intel. System centric simulation involves testing such that the system components (infrastructure stack and software) are characterized for the load they would experience in production, irrespective of how that load is exerted. A new manufacturing execution system software is introduced in Intel's latest fabrication facility. Validation of the product under stress is ...

16 Manageability, availability and performance in Porcupine: a highly scalable, cluster-





based mail service

Yasushi Saito, Brian N. Bershad, Henry M. Levy

December 1999 ACM SIGOPS Operating Systems Review , Proceedings of the seventeenth ACM symposium on Operating systems principles SOSP

Publisher: ACM Press

Full text available: pdf(1.62 MB)

Additional Information: full citation, abstract, references, citings, index terms

This paper describes the motivation, design, and performance of Porcupine, a scalable mail server. The goal of Porcupine is to provide a highly available and scalable electronic mail service using a large cluster of commodity PCs. We designed Porcupine to be easy to manage by emphasizing dynamic load balancing, automatic configuration, and graceful degradation in the presence of failures. Key to the system's manageability, availability, and performance is that sessions, data, and underlying serv ...

17 Database replication with Slony-I

Ludovic Marcotte

June 2005 Linux Journal, Volume 2005 Issue 134

Publisher: Specialized Systems Consultants, Inc.

Full text available: html(22.00 KB) Additional Information: full citation, abstract, index terms

Move up to a highly available cluster without leaving behind the open-source database you trust.

18 Session 7: OS architecture II: Increasing relevance of memory hardware errors: a



case for recoverable programming models

Dejan Milojicic, Alan Messer, James Shau, Guangrui Fu, Alberto Munoz September 2000 Proceedings of the 9th workshop on ACM SIGOPS European workshop: beyond the PC: new challenges for the operating system

Publisher: ACM Press

Full text available: pdf(99.65 KB) Additional Information: full citation, abstract, references, citings

It is a common belief that most of computer system failures nowadays stem from programming errors. Computer systems are becoming more complex and harder to maintain and administer, making software errors an even more common case, while contemporary computer architectures are optimized for price and performance and not for availability. In this paper, we raise a case for an increasing relevance of memory hardware soft-errors. In particular with the introduction of 64-bit processors, memory scalin ...

19 Experience reports: software architecture II: The co-evolution of a hype and a software architecture: experience of component-producing large-scale EJB early adopters

Lutz Prechelt

May 2003 Proceedings of the 25th International Conference on Software **Engineering**

Publisher: IEEE Computer Society Full text available: pdf(367.70 KB)

Publisher Site

Additional Information: full citation, abstract, references, index terms

abaXX.components was one of the first API software products fully based on Enterprise JavaBeans™ (EJB) technology. We describe the evolution of its architecture as it moved from simply taking the initial EJB hype for the truth, through several intermediate stages, to using EJB simply as one of several encapsulated implementation techniques. So far, the public perception of how to use EJB properly evolved along a similar path, lagging 6 to 12 months behind.

20 Posters: Data versioning techniques for internet transaction management



Ramkrishna Chatterjee, Gopalan Arun

May 2005 Special interest tracks and posters of the 14th international conference on **World Wide Web**

Publisher: ACM Press

Full text available: pdf(134.78 KB) Additional Information: full citation, abstract, references, index terms

An Internet transaction is a transaction that involves communication over the Internet using standard Internet protocols such as HTTPS. Such transactions are widely used in Internet-based applications such as e-commerce. With the growth of the Internet, the volume and complexity of Internet transactions are rapidly increasing. We present data versioning techniques that can reduce the complexity of managing Internet transactions and improve their scalability and reliability. These techniques have ...

Keywords: internet transaction, scalability, versioning

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21 Systems and prototypes: Phoenix project: fault-tolerant applications

window

Roger Barga, David Lomet

June 2002 ACM SIGMOD Record, Volume 31 Issue 2

Publisher: ACM Press

Full text available: pdf(847.56 KB) Additional Information: full citation, abstract, references, citings

After a system crash, databases recover to the last committed transaction, but applications usually either crash or cannot continue. The Phoenix purpose is to enable application state to persist across system crashes, transparent to the application program. This simplifies application programming, reduces operational costs, masks failures from users, and increases application availability, which is critical in many scenarios, e.g., ecommerce. Within the Phoenix project, we have explored how to ...

22 Industrial session: potpourri: Recovery principles of MySQL Cluster 5.1

Mikael Ronström, Jonas Oreland

August 2005 Proceedings of the 31st international conference on Very large data bases VLDB '05

Publisher: VLDB Endowment

Full text available: pdf(299.62 KB) Additional Information: full citation, abstract, references, index terms

MySQL Cluster is a parallel main memory database. It is using the normal MySQL software with a new storage engine NDB Cluster. MySQL Cluster 5.1 has been adapted to also handle fields on disk. In this work a number of recovery principles of MySQL Cluster had to be adapted to handle very large data sizes. The article presents an efficient algorithm for synchronizing a starting node with very large data sets. It provides reasons for the unorthodox choice of a no-steal algorithm in the buffer manag ...

23 A novel Fuzzy Logic Controller (FLC) for shortening the TCP channel roundtrip time by eliminating user buffer overflow adaptively

Wilfred W. K. Lin, Allan K. Y. Wong, Tharam S. Dillon

January 2005 Proceedings of the Twenty-eighth Australasian conference on Computer Science - Volume 38 ACSC '05

Publisher: Australian Computer Society, Inc.

Full text available: pdf(951.23 KB) Additional Information: full citation, abstract, references, index terms

The proposed Fuzzy Logic Controller (FLC) is a novel approach for dynamic buffer tuning at the user/server level. It eliminates buffer overflow by ensuring that the buffer length always cover the queue length adaptively. The FLC and the AQM (active queue management) mechanisms at the router/system level together form a unified solution to stifle TCP (Transmission Control Protocol) channel buffer overflow over the Internet. The FLC contributes to: a) prevent the AQM resources dished out at ...

Keywords: FLC, PIDC, active queue management, buffer overflow, dynamic buffer tuning, internet, traffic pattern

24 Cryptography as an operating system service: A case study

Angelos D. Keromytis, Jason L. Wright, Theo De Raadt, Matthew Burnside February 2006 ACM Transactions on Computer Systems (TOCS), Volume 24 Issue 1

Publisher: ACM Press

Full text available: pdf(669.12 KB) Additional Information: full citation, abstract, references, index terms

Cryptographic transformations are a fundamental building block in many security applications and protocols. To improve performance, several vendors market hardware accelerator cards. However, until now no operating system provided a mechanism that allowed both uniform and efficient use of this new type of resource. We present the OpenBSD Cryptographic Framework (OCF), a service virtualization layer implemented inside the operating system kernel, that provides uniform access to accelerator functio ...

Keywords: Encryption, authentication, cryptographic protocols, digital signatures, hash functions

25 An open architecture for next-generation telecommunication services

Gregory W. Bond, Eric Cheung, K. Hal Purdy, Pamela Zave, J. Christopher Ramming February 2004 ACM Transactions on Internet Technology (TOIT), Volume 4 Issue 1

Publisher: ACM Press

Additional Information: full citation, abstract, references, citings, index Full text available: pdf(237.24 KB)

An open (in the sense of extensible and programmable) architecture for IP telecommunications must be based on a comprehensive strategy for managing feature interaction. We describe our experience with BoxOS, an IP telecommunication platform that implements the DFC technology for feature composition. We present solutions to problems, common to all efforts in IP telecommunications, of feature distribution, interoperability, and media management. We also explain how BoxOS addresses many deficiencie ...

Keywords: Component architectures, Intelligent Network architecture, Session Initiation Protocol, electronic mail, feature interaction, instant messaging, multimedia systems. network addressing, network interoperation, network optimization, network protocols, service creation

26 Migration: Optimizing the migration of virtual computers

Constantine P. Sapuntzakis, Ramesh Chandra, Ben Pfaff, Jim Chow, Monica S. Lam, Mendel Rosenblum

December 2002 ACM SIGOPS Operating Systems Review, Volume 36 Issue SI

Publisher: ACM Press

Full text available: pdf(1.68 MB) Additional Information: full citation, abstract, references, citings

This paper shows how to quickly move the state of a running computer across a network, including the state in its disks, memory, CPU registers, and I/O devices. We call this state a capsule. Capsule state is hardware state, so it includes the entire operating system as well as applications and running processes. We have chosen to move x86 computer states because x86 computers are common, cheap, run the software we use, and have tools for migration. Unfortunately, x86 c ...

27 An XML query engine for network-bound data

Zachary G. Ives, A. Y. Halevy, D. S. Weld

December 2002 The VLDB Journal — The International Journal on Very Large Data Bases, Volume 11 Issue 4

Publisher: Springer-Verlag New York, Inc.

Full text available: 🔁 pdf(351.86 KB) Additional Information: full citation, abstract, citings, index terms

XML has become the lingua franca for data exchange and integration across administrative and enterprise boundaries. Nearly all data providers are adding XML import or export capabilities, and standard XML Schemas and DTDs are being promoted for all types of data sharing. The ubiquity of XML has removed one of the major obstacles to integrating data from widely disparate sources - namely, the heterogeneity of data formats. However, general-purpose integration of data across the wide are a also re ...

Keywords: Data integration, Data streams, Query processing, Web and databases, XML

28 Articles: The Deliberate Revolution

Mike Burner

March 2003 Queue, Volume 1 Issue 1

Publisher: ACM Press

Full text available: pdf(326.81 KB)

html(64.11 KB)

Additional Information: full citation, index terms

29 Run-time adaptation in river



Remzi H. Arpaci-Dusseau

February 2003 ACM Transactions on Computer Systems (TOCS), Volume 21 Issue 1

Publisher: ACM Press

Full text available: pdf(849.04 KB) Additional Information: full citation, abstract, references, index terms

We present the design, implementation, and evaluation of run-time adaptation within the River dataflow programming environment. The goal of the River system is to provide adaptive mechanisms that allow database query-processing applications to cope with performance variations that are common in cluster platforms. We describe the system and its basic mechanisms, and carefully evaluate those mechanisms and their effectiveness. In our analysis, we answer four previously unanswered and important que ...

Keywords: Performance availability, clusters, parallel I/O, performance faults, robust performance, run-time adaptation

30 Industry track papers and presentations: technology trends: Building enterprise



portals: principles to practice

Tushar K. Hazra

May 2002 Proceedings of the 24th International Conference on Software Engineering

Publisher: ACM Press

Full text available: pdf(1.85 MB)

Additional Information: full citation, abstract, references, index terms

Primary objective of this paper is to offer an exclusive view of constructing and deploying enterprise portals by using a component-based development approach. As the dot-com hype dies down, most companies are forced to revisit their enterprise-wide Web integration strategies. This paper offers a pragmatic roadmap that these companies may follow in their upcoming enterprise portal deployment initiatives. The academic world plays a significant role in the advances of the portal technology. In this ...

31 Business Continuity Planning

Martin Nemzow

July 1997 International Journal of Network Management, Volume 7 Issue 3

Publisher: John Wiley & Sons, Inc.

Full text available: pdf(295.36 KB) Additional Information: full citation, abstract, references, index terms

This article considers various strategies for protecting an organisation from both natural and man-made disasters. The differences between business continuity planning, and disaster recovery planning are recognised. © 1997 John Wiley & Sons, Ltd.

32 Measurement tools: Robust synchronization of software clocks across the internet

Darryl Veitch, Satish Babu, Attila Pàsztor

October 2004 Proceedings of the 4th ACM SIGCOMM conference on Internet measurement

Publisher: ACM Press

Full text available: pdf(1.59 MB) Additional Information: full citation, abstract, references, index terms

Accurate, reliable timestamping which is also convenient and inexpensive is needed in many important areas including real-time network applications and network measurement. Recently the TSC register, which counts CPU cycles in popular PC architectures, was proposed as the basis of a new software clock which in terms of rate performance performs as well as more expensive GPS alternatives. Smooth and precise clock rate is essential to measure time <i>differences</i> accurately. We show ...

Keywords: GPS, NTP, network measurement, round-trip time, software clock, synchronization, timing

33 Implementing a network improvement action plan

Kim Todd, Jon Rickman, Tabatha Verbick

October 2004 Proceedings of the 32nd annual ACM SIGUCCS conference on User services

Publisher: ACM Press

Full text available: pdf(182.43 KB) Additional Information: full citation, abstract, index terms

Firewall failures and the recent onslaught of computer viruses and worms, such as Klez, loveletter, SoBig, and BadBoy, increased network traffic and ever-growing network abuse, propelled security awareness at Northwest Missouri State University to a higher level and increased the need for finding and implementing effective solutions.

Northwest's Information Systems Department was able to build awareness of computer security issues, decrease network abuse, institute significant enhance ...

Keywords: communication, customer service, network management, network stability

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1 Effective fine-grain synchronization for automatically parallelized programs using optimistic synchronization primitives



Martin C. Rinard

November 1999 ACM Transactions on Computer Systems (TOCS), Volume 17 Issue 4

Publisher: ACM Press

Full text available: pdf(637.69 KB)

Additional Information: full citation, abstract, references, citings, index terms, review

This article presents our experience using optimistic synchronization to implement finegrain atomic operations in the context of a parallelizing compiler for irregular, objectbased computations. Our experience shows that the synchronization requirements of these programs differ significantly from those of traditional parallel computations, which use loop nests to access dense matrices using affine access functions. In addition to coarse-grain barrier synchronization, our irregular comput ...

Keywords: atomic operations commutativity analysis, optimistic synchronization, parallel computing, parallelizing compilers, synchronization

2 Architectural principles and techniques for distributed multimedia application support



in operating systems

Geoff Coulson, Gordon Blair

October 1995 ACM SIGOPS Operating Systems Review, Volume 29 Issue 4

Publisher: ACM Press

Full text available: pdf(659.83 KB) Additional Information: full citation, abstract, citings, index terms

We propose some architectural principles we have found useful for the support of continuous media applications in a microkernel environment. In particular, we discuss i) the principle of upcall-driven application structuring whereby communications events are system rather than application initiated, ii) the principle of split-level system structuring whereby key system functions are carried out co-operatively between kernel and user level components and iii) the principle of decoupling of contro ...

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Frangipani: a scalable distributed file system



Chandramohan A. Thekkath, Timothy Mann, Edward K. Lee

window

October 1997 ACM SIGOPS Operating Systems Review, Proceedings of the sixteenth ACM symposium on Operating systems principles SOSP '97, Volume 31 Issue

Publisher: ACM Press

Full text available: pdf(2.20 MB)

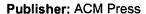
Additional Information: full citation, references, citings, index terms

Decentralized storage systems: lvy: a read/write peer-to-peer file system



Athicha Muthitacharoen, Robert Morris, Thomer M. Gil, Benjie Chen

December 2002 ACM SIGOPS Operating Systems Review, Volume 36 Issue SI



Full text available: pdf(1.65 MB)

Additional Information: full citation, abstract, references

Ivy is a multi-user read/write peer-to-peer file system. Ivy has no centralized or dedicated components, and it provides useful integrity properties without requiring users to fully trust either the underlying peer-to-peer storage system or the other users of the file system. An Ivy file system consists solely of a set of logs, one log per participant. Ivy stores its logs in the DHash distributed hash table. Each participant finds data by consuiting all logs, but performs modifications by appendi ...

File and storage systems: The Google file system



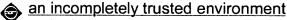
Sanjay Ghemawat, Howard Gobioff, Shun-Tak Leung

October 2003 Proceedings of the nineteenth ACM symposium on Operating systems principles

Publisher: ACM Press

Keywords: clustered storage, data storage, fault tolerance, scalability

4 Decentralized storage systems: Farsite: federated, available, and reliable storage for



Atul Adya, William J. Bolosky, Miguel Castro, Gerald Cermak, Ronnie Chaiken, John R.

Douceur, Jon Howell, Jacob R. Lorch, Marvin Theimer, Roger P. Wattenhofer December 2002 ACM SIGOPS Operating Systems Review, Volume 36 Issue SI

Publisher: ACM Press

Full text available:

Additional Information:

pdf(1.87 MB)

full citation, abstract, references

Farsite is a secure, scalable file system that logically functions as a centralized file server but is physically distributed among a set of untrusted computers. Farsite provides file availability and reliability through randomized replicated storage; it ensures the secrecy of file contents with cryptographic techniques; it maintains the integrity of file and directory data with a Byzantine-fault-tolerant protocol; it is designed to be scalable by using a distributed hint mechanism and delegatio ...

The evolution of Coda



M. Satyanarayanan

May 2002 ACM Transactions on Computer Systems (TOCS), Volume 20 Issue 2

Publisher: ACM Press

Full text available: pdf(441.35 KB)

Additional Information: full citation, abstract, references, citings, index

Failure-resilient, scalable, and secure read-write access to shared information by mobile and static users over wireless and wired networks is a fundamental computing challenge. In this article, we describe how the Coda file system has evolved to meet this challenge through the development of mechanisms for server replication, disconnected operation, adaptive use of weak connectivity, isolation-only transactions, translucent caching, and opportunistic exploitation of hardware surrogates. For eac ...

Keywords: Adaptation, Linux, UNIX, Windows, caching, conflict resolution, continuous data access, data staging, disaster recovery, disconnected operation, failure, high availability, hoarding, intermittent networks, isolation-only transactions, low-bandwidth networks, mobile computing, optimistic replica control, server replication, translucent cache management, weakly connected operation

6 Decentralized storage systems: Taming aggressive replication in the Pangaea wide-





area file system

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Pangaea is a wide-area file system that supports data sharing among a community of widely distributed users. It is built on a symmetrically decentralized infrastructure that consists of commodity computers provided by the end users. Computers act autonomously to serve data to their local users. When possible, they exchange data with nearby peers to improve the system's overall performance, availability, and network economy. This approach is realized by aggressively creating a replica of a file w ...

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